

Remarks/Arguments

Claims 1, 2, 5-11, 13-21, 23 and 24 are pending in the present application. Claims 1, 2, 5-11, 13-21, 23 and 24 have been rejected. No claims were merely objected to and no claims were allowed. By entry of this amendment, no claims are cancelled, no claims are amended and no new claims are added. No new matter is entered.

Objection under 35 U.S.C. §132

The examiner asserts the amendment filed January 22, 2007 is objected to under 35 U.S.C. §132(a) because the amendment introduces new matter into the disclosure. The examiner asserts the added material which is not supported by the original disclosure is as follows: “a focal point of said laser is about 0.01 inches to about 1 inch above the affected section”.

Applicants draw the examiner’s attention to page 5, third paragraph of Applicants’ disclosure as originally filed. Applicants’ specification states the following:

“An apparatus capable of performing such laser cladding process is described in U.S. Pat. No. 5,449,536 incorporated by reference herein.”

The material in question is found at col. 7, l. 67-col. 8, l. 1 of U.S. Pat. No. 5,449,536 (‘536) to Funkhouser, an issued U.S. patent. Applicants properly incorporated by reference the entirety of the disclosure of the ‘536 patent into the specification as originally filed. Applicants are entitled to specifically incorporate any information recited in the ‘536 patent.

For at least this reason, Applicants contend the matter identified by the examiner is not new matter under 35 U.S.C. §132(a).

In light of the foregoing, Applicants respectfully request the examiner withdraw the objection under 35 U.S.C. §132(a) and find the amendments to the claims and specification do not constitute new matter.

Claim Rejections-35 U.S.C. §103

The examiner asserts claims 1, 5-10, 13-20 and 23-24 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S.P.N. 6,495,793 to Tewari (“Tewari”) in view of U.S.P.N. 6,387,541 to Gray et al. (“Gray”) and U.S.P.N. 5,449,536 to Funkhouser (“Funkhouser”) or over Tewari in view of Gray and U.S.P.N. 5,043,548 to Whitney et al. (“Whitney”). Applicants

respectfully traverse the rejection.

Tewari teaches a method for weld repairing, without preheating, a gas turbine engine blade airfoil (col. 2, ll. 54-56). The laser beam, operating in a power range of about 50-10000 watts per centimeter, is focused away from the substrate surface to provide a laser spot in the size range of about 0.03-0.2 inches (Abstract; col. 4, ll. 35-43). Controlling the heat input at the surface of the weld repair is provided through selection of a combination of laser power, laser beam focus away from the substrate surface to provide a selected spot size range, power feed rate and relative movement between the substrate surface and the laser spot (col. 2, ll. 33-38 and col. 4, ll. 18-25). In an example, Tewari teaches the laser beam was focused away from the surface portion of the airfoil tip to provide on the radially outer surface a laser spot in the range of about 0.03-0.20 inches in diameter to reduce the overall power density (power per unit area) (col. 5, ll. 8-16).

Applicants' independent claims 1, 10 and 19 are all directed to methods for repairing an article affected by sulphidation. Generally, Applicants' method claims recite steps concerning the dimensional restoration of an article affected by sulphidation. It is known that cleaning airfoils, e.g., affected by sulphidation, may cause the structures to become very thin afterwards. Above a given thickness, the airfoil can be reused in the engine. Below a given thickness, either a replacement airfoil must be used or the airfoil must be repaired by replacing any eroded material or otherwise restoring the eroded section. Tewari's teachings are specifically geared toward repairing an airfoil that can be reused in the engine and, in turn, specifically teaches repairing minor cracks in airfoil tips. Tewari does not suggest performing other types of repairs such as dimensional restoration. Repairing cracks and dimensionally restoring components are recognized as being entirely different repair processes as known to one of ordinary skill in the art. Dimensional restoration involves replacing eroded material and/or restoring an eroded section of an airfoil. One such process is set forth in Applicants' claimed method. Tewari cannot provide the requisite motivation to one of ordinary skill in the art to seek out teachings directed to dimensional restoration as such teachings are so far opposite teachings concerning repairing cracks

The examiner relies upon the teachings of Gray, Funkhouser and Whitney to provide the requisite motivation to alter the basic teachings of Tewari and teach the dimensional restoration

steps recited in Applicants' claims. However, none of the cited references provide the necessary teachings or suggestions to cure the deficiencies present in the teachings of Tewari. First, Gray, Funkhouser and Whitney all teach applying a coating(s) to a substrate in an effort to repair cracks much like the teachings disclosed in Tewari. Secondly, Gray, Funkhouser and Whitney do not consider expanding the scope of their respective teachings to include dimensional restoration. Unlike Applicants' claimed methods, none of these cited references teaches or suggests a process for dimensionally restoring an article. Applicants' claimed methods may not explicitly recite "dimensionally restoring"; however, one of ordinary skill in the art recognizes Applicants' claims are directed to replacing eroded material and/or restoring eroded sections of articles affected by sulphidation. Applicants contend one of ordinary skill in the art would not be motivated by the lack of teaching and suggestion offered by either Gray, Funkhouser or Whitney to alter the teaching of Tewari and disclose each and every claim element recited in Applicants' claims.

Furthermore, and contrary to the examiner's position, none of these four references mentions anything about heat treating or machining the repaired component after laser cladding takes place. Applicants respectfully request the examiner revisit and reconsider the teachings of Tewari, Gray, Funkhouser and Whitney. No matter how the four references are combined, their combined teachings fail to disclose each and every element of Applicants' claimed methods.

For at least these reasons, Applicants contend independent claims 1, 10 and 19 are patentable and not obvious in view of the combined teachings of Tewari, Gray and Funkhouser or Tewari, Gray and Whitney.

In light of the foregoing, Applicants respectfully request the examiner withdraw the rejection under 35 U.S.C. 103(a) and find claims 1, 5-10, 13-20 and 23-24 are allowable.

The examiner asserts claims 2, 11 and 21 are rejected under 35 U.S.C. §103(a) as being unpatentable over Tewari, Gray and Funkhouser or Whitney, as stated above in the above paragraph and further in view of U.S.P.N. 6,173,491 to Goodwater et al. ("Goodwater"). Applicants respectfully traverse the rejection.

Applicants reiterate their remarks with respect to the combined teachings of Tewari, Gray

and Funkhouser or Whitney. Applicants contend the teaching of Goodwater cannot cure the deficiencies present in the combined teachings of the aforementioned cited references.

Goodwater generally teaches a method for refurbishing turbine engine vanes (Abstract). In framing the present rejection, the examiner cites columns 5-6 and relies upon disclosure directed to machining processes. Goodwater teaches the machining the platforms only after brazing the platforms to seal minor cracks (col. 5, ll. 9-36). The actual cleaning steps are performed prior to brazing (col. 4, l. 62 – col. 5, l. 9). Goodwater teaches a suitable cleaning cycle includes first fluoride cleaning, which takes place in an atmospheric furnace wherein a chemical reaction takes place that reduces (breaks up) aluminum and titanium oxides on the vane surfaces and in exposed cracks. According to Goodwater, the next step is a hydrogen vacuum clean wherein the hydrogen gas acts to reduce chromium oxides to pure chromium. The final step is a vacuum clean cycle to pull any residual oxides (Al, Ti, Cr) from the surface of the parts, so that the parts are finally ready for braze. These cleaning techniques may be acceptable when preparing part for brazing; however, such cleaning techniques are not abrasive cleaning techniques such as grit blasting. As evidenced by the Goodwater's disclosure, the fluoride cleaning causes a chemical reaction to take place that breaks up aluminum and titanium dioxides. There is no teaching or suggestion present in Goodwater to prove sulphidation may be removed via fluoride cleaning. Furthermore, Goodwater arguably teaches away from abrasively cleaning an affected area as Goodwater relies upon a chemical reaction to reduce aluminum and titanium oxide. Consequently, Applicants contend Goodwater cannot cure the deficiencies present in the combined teachings of Tewari, Gray and Funkhouser or Whitney.

For at least these reasons, Applicants contend claims 2, 11 and 21 are patentable and not obvious in light of the combined teachings of Tewari, Gray and Funkhouser or Whitney further in view of Goodwater.

In light of the foregoing, Applicants respectfully request the examiner withdraw the rejection under 35 U.S.C. §103(a) and find claims 2, 11 and 21 are allowable.

CONCLUSION

In light of the foregoing, it is submitted that all of the claims as pending patentably define over the art of record and an early indication of same is respectfully requested.

An earnest and thorough attempt has been made by the undersigned to resolve the outstanding issues in this case and place same in condition for allowance. If the Examiner has any questions or feels that a telephone or personal interview would be helpful in resolving any outstanding issues which remain in this application after consideration of this amendment, the Examiner is courteously invited to telephone the undersigned and the same would be gratefully appreciated.

It is submitted that the claims as amended herein patentably define over the art relied on by the Examiner and early allowance of same is courteously solicited.

If any fees are required in connection with this case, it is respectfully requested that they be charged to Deposit Account No. 02-0184.

Respectfully submitted,
KENNY CHENG ET AL.

By /Ross J. Christie #47492/
Ross J. Christie
Attorney for Applicants
Reg. No.: 47,492

Telephone: 203-777-6628 x116
Telefax: 203-865-0297

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